

REMARKS

The present invention includes claims 1-7 of which claims 1 and 3 are independent claims. Claims 2 and 4-7 depend directly or indirectly from one of claims 1 or 3.

In response to the non-final Office Action of February 24, 2005, the claims of the present invention have been amended to further clarify the claimed invention and are respectfully to be patentable in view of the cited reference to Paraschac, U.S. Statutory Invention Registration H1745. In particular, the Office Action rejected claims 1-7 under 35 U.S.C. Section 102(b) as being anticipated by Paraschac.

In particular, the Office Action relies upon the apparatus shown and described in Fig. 5 of Paraschac. In response, applicant's respectfully point out that the invention of the current application is fundamentally different from the structure and function shown and described in Fig. 5 of Paraschac. In addition, claims 1 and 3 have been amended to further clarify the invention. Accordingly, the claimed subject matter is respectfully believed to be allowable.

The claims of the present invention are particularly directed to an apparatus for forming non-conductive lines of ablation in tissue, such as cardiac tissue, without excessive tissue damage. In claim 1, the claimed electrode/jaw arrangement provides that the "width of the clamping surface

exclusive of the width of the tissue contacting portion of the [respective] electrode" is "substantially wider than the width of the tissue contacting portion." In one example shown in Fig. 33-40 of the original application, the claimed electrode/jaw arrangement shows that the tissue contacting portion of each conductive electrode (i.e., in Figs. 33-40, the portion of the conductive electrode which forms part of the clamping surface) is substantially narrower than the portion of the clamping surface exclusive of such tissue contacting portion. Put another way, the width of the clamping surface exclusive of the width of the tissue contacting portion of the electrode is substantially wider than the width of the tissue contacting portion, as recited in claims 1 and 3.

Applicant's disclosure explains several advantages of the claimed electrode/jaw arrangement. For example, at page 16, lines 2-7 of the 2nd full paragraph, applicant's specification discloses that:

Importantly, Figure 9 shows that the electrode/clamp configuration provides a clamped zone of tissue that is wider than the zone of ablated tissue. This is achieved by using an electrode width that is narrower than the clamped tissue width, and preferably less than one-third of the clamped tissue width. (emphasis added)

Examples of applicant's electrode/clamp arrangement is shown and described in the original specification in Figures 9, 21, 26 and 33-51 and at pages 16-20. Applicant's disclosure

further describes that the narrower ablation zone of the claimed invention minimizes the risks associated with thrombus. At page 16, last paragraph, applicant's disclosure states:

The wider zone of clamped tissue serves several purposes. When the clamping members are closed onto tissue, any blood in the clamped zone is squeezed or expressed out. Further, the distance between the electrodes is minimized, so that the ablation zone remains narrow. It is important to isolate the blood from the ablation zone to avoid creating thrombus. Accordingly, a clamped zone that isolates the ablation zone from the blood minimizes the temperature at the periphery of the ablation zone and will reduce the likelihood of the formation of thrombus by the blood in contact with the clamped zone. (emphasis added).

Applicant's disclosure specifically teaches away from thrombus formation by providing a narrower ablation zone than the clamping zone.

In addition, the pending claims require that the jaw members, including a clamping surface of which the respective electrode forms a part, are parallel through a range of clamping motion. Examples of apparatus with this feature are shown in applicant's specification at Figures 1, 7, 18, 20, 25 and 33-37 and are described at page 11, lines 11-14 and line 32 and page 21, lines 22-27. Such feature provides that "the spacing between the jaws [is] substantially uniform or constant" (page 21, lines 26-27). Uniform spacing is understood to provide more uniform current between the electrodes and through the tissue during ablation.

Paraschac Does Not Teach or Suggest Claimed Features

Paraschac intentionally discloses an electrosurgical hemostatic grasping instrument that uses electrical current between the entire widths of the jaw of the end effector "to reduce bleeding along a cut line prior to cutting tissue" (column 1, lines 64-65). Paraschac further expressly requires that its invention "create a selective region of visible coagulation around the end effector to provide visual feedback to the surgeon" so that the surgeon determines when to stop the electrical current. (Column 7, lines 1-3).

In fact, Paraschac expressly touts the advantages of having a substantially uniform electrical field along the entire width between the jaws where it states in Column 2, lines 8-14:

it is beneficial in certain circumstances to develop a substantially uniform electrical field through the tissue between the end effectors. Therefore, it would be beneficial to design an end effector wherein the electrical field is substantially uniform and substantially confined to the region between the tissue contacting faces of the end effectors with only a limited region of thermal spread.

Based on this disclosure, Paraschac teaches away from a treatment zone which is substantially narrower than the width of the jaws clamping surface (or a clamping surface width exclusive of the treatment zone width which is substantially wider than the treatment zone width). In fact, Paraschac consistently teaches away from the claimed electrode/jaw arrangement with

each of its disclosed embodiments, including the embodiment shown in Figs. 5 and 6 which was relied upon in the Office Action of February 24, 2005.

In particular, the embodiment shown in Figs. 5 and 6 of Paraschac is clearly different in structure and function as compared to the claimed subject matter. In Figs. 5 and 6, each jaw member 116 and 117 includes a respective U-shaped electrode 147 and 148 which is arranged to form two wide surfaces disposed on opposite sides of a knife-receiving channel 143. In this regard, a tissue grasping surface 118 and 119 of each jaw member 116 and 117 in Fig. 5 of Paraschac is essentially comprised of these wide surfaces of the corresponding electrode 147 and 148. Further, outer electrodes 170 and 172 provide feedback or thermal spread in an area of tissue 197 surrounding the end effector, as shown in Fig. 6.

Based on this arrangement, it is clearly understood that the electrical current in Fig. 5 of Paraschac will flow from each exposed electrode surface on one jaw member 116 to each exposed electrode surface on the opposite jaw member 116. Specifically, the electrical current flow includes diagonal current flow, as between offset electrodes separated by the knife channel 143, such that the structure of Paraschac intentionally teaches a wide treatment zone which essentially cauterizes the entire lateral extent of tissue disposed between

the jaws. Further, the treatment zone spans a width which is larger than the clamping surface to desiccate tissue which surrounds the end effector so as to provide a visual indication of such cauterization.

This is consistent with the function provided by the structure of Figs. 5 and 6 of Paraschac. Such structure is designed to cauterize a wide area of clamped tissue prior to cutting such tissue. Paraschac expressly teaches that each knife channel 143 is disposed in the center of each jaw's tissue grasping surface 118 and 119 for moving a knife 122 distally along the knife-cutting channel 143. The jaws, thus, must cauterize tissue which extends on both sides of the knife-receiving channel 143 prior to cutting such tissue with the knife 122, which is opposed to the claimed electrode/jaw arrangement.

It would not be obvious to modify the electrode/jaw arrangement in Figs. 5 and 6 of Paraschac. First, Paraschac does not contain any such motivation. In fact, Paraschac is concerned with an entirely different structure and treatment procedure which provides for cauterization of a wide area of tissue prior to cutting such tissue. Paraschac is completely silent on ablation procedures and the risks of thrombus associated therewith. Second, why would there be such motivation? Paraschac expressly teaches that the treatment zone

must be wide enough to extend on either side of a knife-cutting channel for cutting by the knife 122.

In addition, Paraschac consistently requires that the hemostatic treatment zone must be slightly wider than the clamping surfaces of each jaw so as to provide visual feedback to the surgeon outside of the jaws when the jaws are clamped. The embodiment of Figs. 5 and 6 expressly provides a feedback region 197 which extends outside of the jaws, as shown in Fig. 6, and states that: "[a]n area of tissue 197 surrounding the end effector is illustrated in which desiccation of and/or thermal effects on the tissue may be visualized." (Column 5, lines 45-48). The structure of Paraschac is clearly opposed to providing the claimed electrode/jaw arrangement and, thus, it does not teach or suggest the claimed subject matter.

In addition, the electrodes of Fig. 5 of Paraschac are different from the claimed subject matter for another reason. The end effector shown in Fig. 5 does not teach or suggest that the jaws are parallel through a range of clamping spacing, as required by the claims. Rather, the end effector disclosed in Figs. 5 and 6 is a modification to the end effector of the instrument shown in Fig. 4 and, thus, is disclosed only with respect to an instrument having pivotable jaws, as shown in Fig. 4. Paraschac omits any disclosure of jaws of any other type. Accordingly, does not disclose or suggest jaws which are

parallel through a range of clamping spacing, either alone or in combination with the other claimed subject matter.

Information Disclosure Statement

An information disclosure statement and fee accompanies this amendment which lists the published application of applicant's co-pending Serial No. 10/927,745, which was published under No. 2005/0033282. The '745 application is a continuation of the present application.

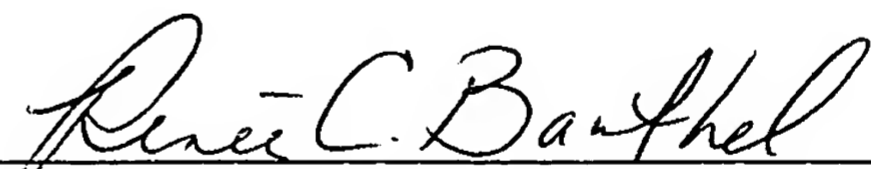
Conclusion

For all the above reasons, it is respectfully requested that the claimed subject matter is not anticipated and would not be obvious to a person of ordinary skill in view of Paraschac. It is further respectfully requested that the pending claims as amended be reconsidered and allowed.

Respectfully submitted,

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